

## 1.0 INTRODUCTION

This “Characterization of the Estero Bay Watershed” is presented as a part of the Estero Bay and Watershed Assessment being conducted for the South Florida Water Management District (SFWMD). This characterization report is part of a series of initiatives that have been undertaken in an effort to balance development and environmental interests in the Estero Bay Watershed.

Population growth in the Estero Bay Watershed has been rapid, and concern regarding potential threats to sensitive natural resources in the watershed as a result of the growth has been expressed. There is concern that the scale of urban and agricultural development will affect the ecological integrity of the region, as well as the environmentally sensitive Everglades National Park and the Big Cypress National Preserve which border the Estero Bay and watershed.

Urban land use in the basin is primarily located in the western developed corridor, the areas around Florida Gulf Coast University, Bonita Springs and western Immokalee. The major wetland and associated upland systems are firmly set in the center and eastern parts of the basin, while the agricultural uses are located on the boundaries and between the large wetland systems. Much of the current and proposed citrus development is occurring in an area occupied by a diverse native flora and fauna, including 31 species listed by state and federal agencies as endangered, threatened or species of special concern, such as the Florida Panther (Mazotti et al., 1995). The State of the Bay Report (1997) for Estero Bay indicated, however, that there seem to be fewer requests for land use amendments to the areas identified for future preservation in the central portion of the basin and continued public support for the acquisition of sensitive lands for preservation is being addressed via acquisition programs such as the Corkscrew Regional Ecosystem Watershed (CREW) and Preservation 2020.

The overall goal of this characterization report is to provide information to be used in an evaluation of existing and future alterations of both water quantity and quality within the Estero Bay Watershed. As part of this overall goal, this and subsequent volumes will characterize existing hydrologic and pollutant loadings in the watershed and evaluate existing and proposed management practices developed to advance the attainment of specific identified goals. Such goals may include:

- reductions in nutrient loadings,
- better timing and better managed volumes of freshwater inputs, and
- reductions in sediment loadings.

The project, Volume B, is one of a series of volumes which make up the Estero Bay Watershed Assessment. The complete series of volumes is:

- Volume A. Literature Survey of the Estero Bay Watershed
- Volume B. Characterization Report
- Volume C. Basin Prioritization Report
- Volume D. Management Goals Report
- Volume E. Monitoring Report
- Volume F. Estero Bay Research Plan

## 1.1 Study Area

The Estero Bay Watershed includes the area in Lee County south of the Caloosahatchee River, parts of northeastern Collier County, and a small portion of Hendry County (Figure 1-1, Plate 1-1). Much of the northern part of the watershed includes the City of Ft. Myers. Other population centers include Bonita Springs and the City of Ft. Myers Beach.

The watershed includes all of Estero Bay, most of which lies within the Estero Bay Aquatic Preserve, and the adjacent barrier islands. Hendry Creek, Mullock Creek, the Estero River, areas of Corkscrew Swamp, Spring Creek, and the Imperial River are major surface water features in the basin. These waterways, with the exception of Ten Mile Canal, are tidally influenced to some degree. The Estero River east of U.S. 41 has slow conveyance and is considered a recharge area along with the Imperial River east of I-75 (JEI, 1998). In some areas, local drainage canals provide limited regional flood protection during wet periods, but also lead to over-drainage during dry periods.

The Estero Bay Watershed is divided into eleven secondary basins for the purpose of this report:

- |                           |                   |
|---------------------------|-------------------|
| • Estero River            | • Ten-Mile Canal  |
| • Spring Creek            | • Cow Creek       |
| • Hendry Creek            | • Corkscrew Swamp |
| • Mullock Creek           | • Lake Trafford   |
| • Six-Mile Cypress Slough | • Imperial River  |
|                           | • Barrier Islands |

Cow, Hendry, and Mullock creeks are coastal basins that flow into north Estero Bay. Six-Mile Cypress Slough and Ten Mile Canal do not discharge directly into the bay but are important conveyances into Mullock Creek, which flows directly into the bay. The Estero River and Spring Creek flow into the bay farther south in the central and southern bay. Sheet flow from Corkscrew Swamp and Lake Trafford basins flows west to the Imperial River before entering Estero Bay at its southern most reaches. The Barrier Islands Basin lies off the coast, along the length of Estero Bay.

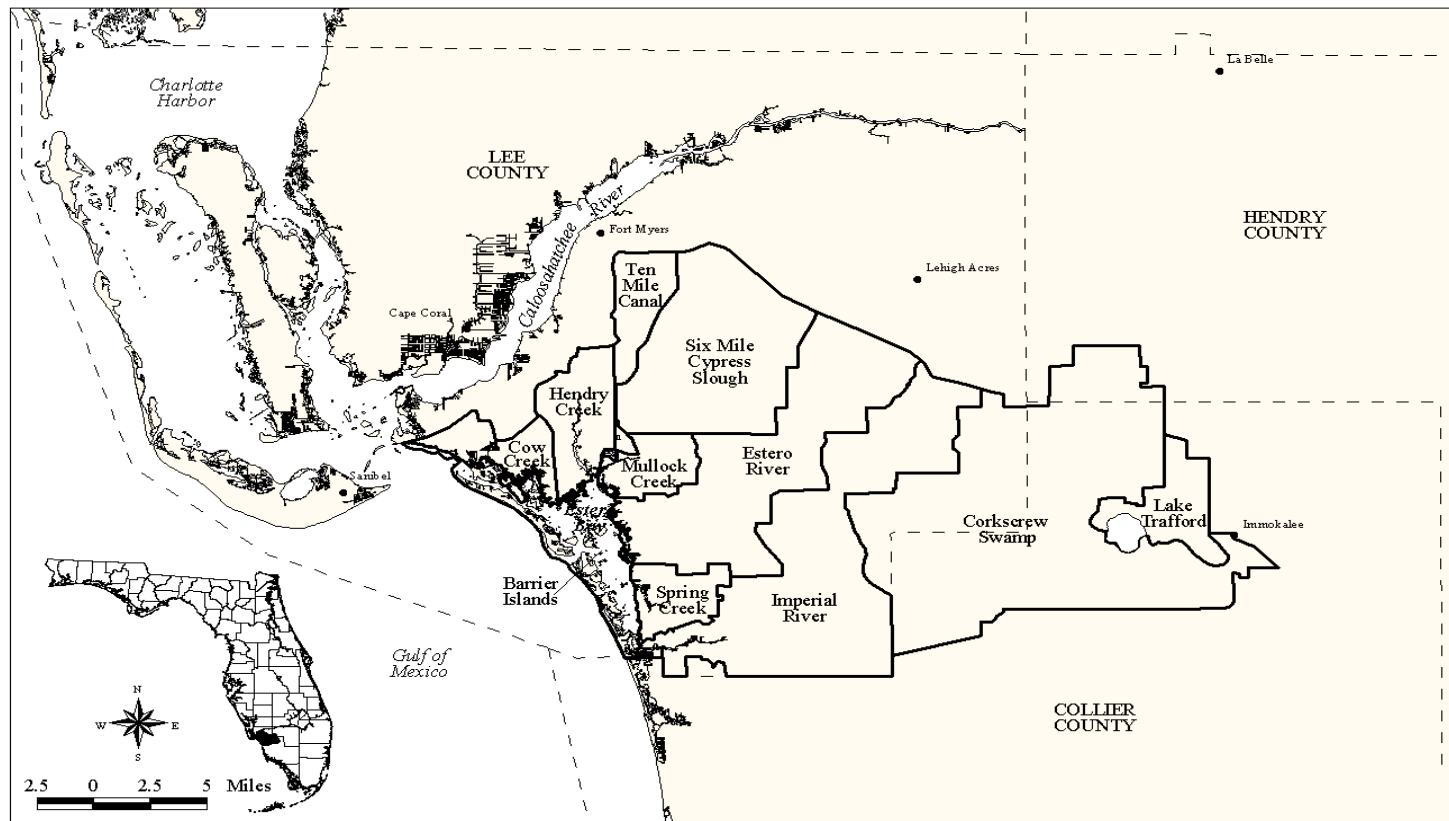


Figure 1-1. The Estero Bay Watershed.

The Corkscrew Swamp Basin is the largest secondary basin in the Estero Bay Watershed, making up nearly 92,000 acres and 31% of the 295,620 acre watershed. The Imperial River, Estero River, and Six-Mile Cypress Slough basins each make up between 35,000 and 54,000 acres and together make up another 45% of the watershed. Cow Creek, Ten-Mile Canal, Hendry Creek, Spring Creek, Lake Trafford, and Barrier Islands basins are much smaller, each making up no more than 5% of the entire watershed.

<b>Table 1-1. Acres and percentage of watershed for the eleven secondary basins in the Estero Bay Watershed.</b>		
<b>SECONDARY BASIN</b>	<b>ACRES</b>	<b>PERCENT</b>
Ten-Mile Canal	8,717	3%
Six-Mile Cypress Slough	35,027	12%
Mullock Creek	6,995	2%
Estero River	45,381	15%
Imperial River	53,664	18%
Cow Creek	7,985	3%
Hendry Creek	11,623	4%
Spring Creek	7,350	2 %
Corkscrew Swamp	91,684	31%
Lake Trafford	11,410	4%
Barrier Islands	15,726	5%
Total	295,620	100%

## 1.2 Background

Because of the rapid rate of development and population growth in southwest Florida and the resulting concern over potential environmental impacts, a series of initiatives has been proposed to balance development and environmental interests. These initiatives include the:

Arnold Committee,  
Charlotte Harbor National Estuary Program,  
Corps of Engineers Environmental Impact Statement, and the  
South Lee County Watershed Plan.

The Arnold Committee, a cooperative planning committee composed of representatives from state and federal regulatory agencies, Lee County Government, the Responsible Growth Management coalition, affected property owners, and environmental organizations. The Committee was formed as a non-regulatory advisory body as part of the settlement agreement between Florida Gulf Coast University and the Responsible Growth Management Coalition. The Arnold Committee was convened and designated to provide a framework for the development of needed actions. Both this Estero Bay Watershed study and the Estero Bay Study are designed to provide the needed background information for the Agency on Bay Management (ABM) and the basis for continuing actions by the South Florida Water Management District. The Estero Bay Watershed Characterization report is part of the Scientific Assessment portion of the Estero Bay Management and Improvement Plan which was developed by the SFWMD with the assistance of the Arnold Committee.

Charlotte Harbor has been identified as one of several nationally significant estuaries as part of the National Estuary Program (NEP), a program funded by the U.S. Environmental Protection Agency (EPA). The goals of the NEP is the restoration and protection of nationally significant estuaries through the identification of the estuaries, the establishment and oversight of a process for improving and protection estuary water quality, and enhancement of the living resources of the estuary (EPA, 1992). Charlotte Harbor, of which Estero Bay makes up the southern-most portion, is one of three regionally important estuarine systems included in the NEP. The Charlotte Harbor NEP will address these problems with the development of a Comprehensive Conservation and Management Plan (CCMP) for managing the estuarine watershed.

The degree of local, state and federal concern regarding existing and potential impacts to regional estuarine systems resulting from hydrologic alterations and the degradation of water quality is indicated by the fact that this estuary has been designated for special study, protection and restoration under regional NEPs. In general, the need for restoration activities has been shown to be greatest for the more northern estuarine systems, where the impacts associated with surrounding development have been both more intense and extended back to prior to the implementation of many of the current environmental regulations and management practices. Conversely, the NEPs have indicated the potential opportunities for prevention and preservation to be the greatest within the watersheds surrounding the more southern southwest Florida estuaries where historic development has been less intense.

Another initiative to seek an effective balance between natural systems protection and economic stability in the region is the U.S. Army Corps of Engineers (USACE) Environmental Impact Statement (EIS) for an area spanning portions of Lee and Collier counties in southwest Florida, in which the Estero Bay Watershed is located. The EIS was drafted in response to the increasing number, size, and complexity of development permit requests by citizens and business interests of southwest Florida and the difficulty of adequately evaluating the cumulative impacts of development

on a permit by permit basis. The EIS was designed to offer regulatory and planning-based remedies to these limitations by examining the “natural and social interactions” in the study area.

The Alternatives Development Group (ADG) was formed to support the USACE in the creation and evaluation of alternatives for the EIS. The specific charge of the ADG was to report on alternatives for improving the regulatory process to:

- protect natural environmental values,
- provide for sustainable economic growth,
- manage appropriate changes in water flows and quality, and
- respect public involvement and private rights.

In addition to the above initiatives, the South Florida Water Management District developed the South Lee County Watershed Plan, which also addresses problems associated with development in Lee and Collier counties. As part of the Plan, Johnson Engineering developed the hydrologic-hydraulic model, an ecological assessment, and a problem identification and evaluation of existing hydrologic-hydraulic conditions in the Estero Bay Watershed (JEI et al., 1992). From this study, it was found that sheet flow has been substantially altered and the cumulative effects of seemingly small hydrologic diversions have changed the direction of flow from basin to basin within the watershed.

### **1.3 Basin Description Objectives**

The objective of this report is to describe and compile relevant data in a format useful for assessment and modeling of the study area. The following five sections are included in this volume:

- Description of Study Area,
- Delineation of Secondary and Tertiary Basins,
- Secondary Basin Descriptions,
- Inventory of Governmental Units, and
- Inventory of Pollution Sources and Description of Water Quality Trends.

Major physical features are delineated, current management practice and the jurisdiction and function of relevant government and regulatory agencies described, and water quantity/quality status and past trends explained. The basin descriptions and watershed data will be used to support the evaluation and ranking of pollution potentials in a later task.